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ABSTRACT

In order to shed additional light on the vocational development process, this study was designed to investigate the construct of work values by administering the Occupational Values Inventory (OVI) to a sample of 680 high school students. The design called for examining the relationship between selected student characteristics which appeared to be related to work values and responses on the OVI at two points in time (end of ninth and tenth grades). Data analysis consisted of examining the zero order correlations between each student characteristic and each value as measured by the OVI and an artificially created change score. Further analysis examined the total relationship between all student characteristics and each value score using Multiple Regression Analysis. Some major findings were: (1) The Interest and Satisfaction, Salary, Personal Goal, and Security values possessed the highest degree of relationship with the student characteristics, while the values of Advancement, and Preparation and Ability possessed the smallest relationships, (2) For the most part, the relationship between OVI values and characteristics were similar for both ninth and tenth grade analyses, and (3) The relationship between ninth and tenth grade values was fairly low (r between .38 and .48). Several implications are discussed. (SB)

THE PENNSYLVANIA STATE UNIVERSITY
DEPARTMENT OF VOCATIONAL EDUCATION

CHANGES IN THE OCCUPATIONAL VALUES OF STUDENTS BETWEEN NINTH AND TENTH GRADE AS RELATED TO COURSE OF STUDY AND OTHER STUDENT CHARACTERISTICS

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Research Coordinating Unit
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PREFACE

This monograph is the fifth in a series of Vocational Development Study (VDS) publications which are produced periodically as reports of a ten year longitudinal study of the vocational development process being conducted in the Department of Vocational Education at The Pennsylvania State University. In this report, the authors have attempted to further explore the construct of Occupational Values using the Occupational Values Inventory (OVI). The development of the OVI is described in a previous monograph in the VDS series (The Measurement of Occupational Values - VDS Monograph No. 3).

In this study the focus was on the change in values from ninth to tenth grade and the relationship between that change and selected student characteristics. In undertaking the study, the authors experienced several methodological difficulties and the exploration of these difficulties constitutes part of the contributions which the study has to make to those interested in the Occupational Values construct. Other contributions which it is hoped this study will make concern the identification of those specific student characteristics which appear to maintain a consistent relationship to values over the time period studied. The study also provides new insights concerning the usefulness of an ipsative values instrument such as the OVI.

During the completion of this monograph, the VDS project staff and the Department of Vocational Education experienced the tragic loss of its leadership when Dr. Joseph T. Impellitteri was killed in an automobile accident enroute to a career education conference at Ohio State University. It is hoped that this VDS monograph and those which will

follow will continue in the direction which he had intended.

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TABLE OF CONTENTS

	Page
PREFACE	ii
LIST OF TABLES	v
VDS CAPSULE OF FINDINGS AND IMPLICATIONS	vi
CHAPTER	
I. ORIGIN AND IMPORTANCE OF THE STUDY	1
Introduction	1
Statement of the Problem	3
II. REVIEW OF RELATED LITERATURE	6
Introduction	6
Studies in the Area of Career Development Which are Related to Change in Work Values Over Time	7
III. PROCEDURES OF THE INVESTIGATION	13
Population and Sample	13
Independent Variables	14
The Dependent Variables	18
Analysis	19
IV. FINDINGS	22
Introduction	22
Question #1	24
Question #2	26
Question #3	30
Question #4	31
Question #5	31
Question #6	33
V. SUMMARY, CONCLUSION AND DISCUSSION	35
Summary	35
Conclusions	37
Discussion	43
REFERENCES	46
VOCATIONAL DEVELOPMENT STUDY SERIES	49

LIST OF TABLES

Table — Page

1. Mean and Standard Deviation for 9th Grade, 10th Grade and OVI Change Scores and Correlation Between 9th and 10th Grade OVI Scores 23

2. Correlation Between Independent Variables and OVI 9th and 10th Grade Scores 25

3. Regression Analysis Between the Eight Independent Variables and Each of the Seven OVI Values for the 9th Grade Sample. 28

4. Regression Analysis Between the Eight Independent Variables and Each of the Seven OVI Values for the 10th Grade Sample 29

5. Correlations Between OVI Change Scores and Independent Variables and Intercorrelation of Independent Variables . . 32

6. Interaction Between Sex and Curriculum in the 12 Significant MRA Models 34

VDS CAPSULE OF FINDINGS AND IMPLICATIONS

It is hoped that this short abstract of findings and implications will be helpful to those who would like a quick overview of the major aspects of this study.

Findings

1. The Interest and Satisfaction, Salary, Personal Goal and Security values possessed the highest degree of relationship with the student characteristics used in this study and appear to be related to curriculum choice.

2. The values of Advancement, and Preparation and Ability possessed the smallest relationships with the student characteristics used in this study.

3. For the most part, the relationship between the OVI values and the student characteristics were similar for both ninth and tenth grade analyses. The degree of relationship tended to decrease over the one year period.

4. Using all student characteristics taken together, the largest amount of explained variance for any one value (Interest and Satisfaction) was equal to 17 percent.

5. The relationship between ninth and tenth grade values was fairly low (r between .38 and .48).

6. Change in values using change scores was not found to be related to any of the student characteristics used in the study.

7. Interaction between Curriculum and Sex was found to exist for the values of Interest and Satisfaction, Prestige and Security.

Implications

1. The values of Interest and Satisfaction, Salary, Personal Goal and Security appear to be very significant values during the ninth to tenth grade period and appear to have an impact upon curriculum choice.

2. The values of Advancement, and Preparation and Ability are either unrelated to the student characteristics used in the study or are poorly measured by the OVI.

3. The relationship between student characteristics and values appears to be fairly stable between ninth and tenth grade.

4. Occupational values are difficult to predict or are not adequately measured by the OVI.

5. An ipsative instrument such as the OVI possibly is not appropriate in assessing change for an entire value structure.

6. The use of change scores is not an appropriate means to assess change in values on an individual basis.

7. The effect which curriculum has upon the occupaitonal values of ninth and tenth grade students does apparently differ with respect to Sex of the students for such values as Interest and Satisfaction, Prestige and Security.

I

ORIGIN AND IMPORTANCE OF THE STUDY

Introduction

Today's society is one characterized by many social and economic disorders. At the core of this situation is a system of education which is failing to meet the needs of the individual. According to many educators, what is needed now is more and better occupational education. There is a good deal of support in favor of occupational education in the Career Education model proposed by Marland (1970), but the content and organization of such programs can be disputed in their present condition.

Before a program of occupational education can be effectively employed within a school system, a theoretical framework or model must be established to serve as guidelines for the program. In order for this framework to be developed, an adequate explanation of the phenomenon of vocational behavior must first be established. At the present, there are numerous theories describing vocational behavior such as those proposed by Ginzberg (1951), Super (1953), Roe (1956) and Holland (1959), but these theories seem to fall short in many respects.

The lack of a complete theory of vocational behavior is one of the more pressing problems in the development of an adequate model for career education. It is the process of vocational development, whether it be motivated by instincts, traits, genetic factors, or social influences, which must be understood if there is going to be an acceptable theory on which to base career education or any other curriculum model. It is therefore considered fruitful to research those constructs which

are part of the personality structure and deal with the dynamics of its workings. The intention is to promote greater understanding of the occupational decision-making process and the influence of that process upon one's degree of success and satisfaction resulting from those decisions.

Because of their theoretical accountability for vocational behavior, work values are one of the more important constructs in the investigation of the process of occupational choice (Zytowski, 1970). Katz (1963) and others have indicated that if vocational psychology can gain further understanding of the hierarchy of work values within the individual, greater insight will be gained into the preference building process. It is therefore considered relevant to research the formation, stability and maintenance of work values for the purpose of building a unified framework which would help explain the phenomenon of vocational behavior.

The concept of work values has been viewed as a construct or personality variable which maintains a dynamic relationship with vocational behavior. To gain an accurate assessment or to obtain construct validation is a complex process which is very situational and relative to inferential judgements. The process becomes more complex when the research is focused on the degree of change in the intensity and direction of a personality variable such as work values. Finding appropriate predictors of this dynamic process provides even greater problems and requires rigor in research design. Taking into consideration all of the difficulties inherent in an investigation of this nature, this study will attempt to discover the relationship between changes in work values and selected personal and situational characteristics. While there are many possible reasons why this particular study is of benefit, the

author's justification is that a complete theory of career development is needed, and that research dealing with any significant aspect of work values will aid in the attainment of this goal.

Statement of the Problem

In order to further explore the work values construct, Impellitteri and Kapes (1971) have developed the Occupational Values Inventory (OVI). Preliminary studies using this instrument have supported its reliability and validity for use with ninth and tenth graders. This investigation is part of a continuing longitudinal research effort being conducted at The Pennsylvania State University in the Department of Vocational Education under the title of Vocational Development Studies (VDS).

From previous research, it has been found that such characteristics as sex, general intelligence, college aspiration, and high school curriculum choice are related to certain OVI values in ninth grade. A relationship has also been found between OVI values measured in ninth grade and curriculum enrolled in and GPA at the end of tenth grade for male students (Kapes, 1971).

What this investigation is attempting to uncover is whether or not a change in work values from ninth to tenth grade is related to certain school and student characteristics. In order to provide an adequate research design to investigate this question, it is necessary to first establish the relationship between the characteristics selected for investigation and the work values criterion in ninth grade. If these characteristics are unrelated to work values at the beginning of the change period, there is little chance that they possess any relationship with a change in the criterion. Secondly, it is necessary to examine

the relationship between the selected characteristics and the criterion at the end of the change period in order to establish what effect the time interval has on these relationships. Relationships between ninth and tenth grade could change as a result of maturation, differences in school experiences and error in measurement. Lastly, it is necessary to look at the relationship between these same variables which have been evaluated as ninth and tenth grade predictors and the actual change in values scores.

A research design of this nature will not only control many of the confounding variables inherent in a cross-sectional design, but it will also help to insure that the characteristics and criterion selected to examine a change in values have had their predictive validity examined for the two points in time over which change is being assessed. Based on previous research, the student characteristics of ability, socioeconomic status, achievement, sex and curriculum choice were selected as possibly being related to a change in values. Sex and curriculum choice in tenth grade are considered to be the primary characteristics under consideration here, while ability, socioeconomic status and achievement are included as intervening variables. The OVI was selected as the measure of work values for this study and the findings of the study should shed additional light on the validity of the OVI.

In order to provide a framework for the investigation of the relationship between the characteristics selected and a change in work values from ninth to tenth grade, the following questions were posed:

1. What is the relationship between each of the characteristics and each of the seven OVI values as measured in ninth grade and again in tenth grade?

2. What is the relationship between the composite of all of the characteristics taken together and each of the seven OVI values as measured in ninth grade and again in tenth grade?
3. What is the relationship between each of the seven OVI values as measured in ninth grade and these same values as measured in tenth grade?
4. What is the relationship between each of the characteristics and changes in each of the seven OVI values from ninth to tenth grade?
5. What is the relationship between the composite of all of the characteristics taken together and changes in each of the seven OVI values from ninth to tenth grade?
6. In the analysis for Questions numbers 2 and 5 with the effect of ability, achievement and socioeconomic status partialed out, do the two conditions of curriculum (vocational vs. non-vocational) differ with respect to the two conditions of sex (male vs. female)?

II

REVIEW OF RELATED LITERATURE

Introduction

In a study of this nature it becomes necessary to establish relevancy among similar studies in related fields. In order to establish this relationship among other similar studies, a review of the related literature was made. Reports were grouped into the following categories:

1. Studies and reviews in the area of career development, psychology or sociology which relate to occupational values and the process of occupational choice: Ginzberg et al. (1951), Holland and Whitney (1969), Katz (1963), Katzel (1964), Rosenburg (1957), Super (1953), Zytowski (1970).
2. Studies and reviews in the area of career development, psychology or sociology which related work values to student characteristics: Gribbons and Lohnes (1965, 1968), Kapes (1969, 1971), Kennane and Pable (1965), Singer and Stefflre (1954b), Schwarzweller (1960), Sprinthall (1966), Super (1962), Super and Overstreet (1960), Zytowski (1970).
3. Studies in the area of career development which are related to change in work values over time: Dipboye and Anderson (1959), Fleege and Malone (1946), Gribbons and Lohnes (1965, 1968), Thompson (1966), Searle (1962), Singer and Stefflre (1954a), Wagman (1968), and Zytowski

(1970).

The studies included under categories 1 and 2 will not be reviewed here since they have been extensively reviewed in VDS Monographs, numbers 2 and 3. Monograph number 2 (Kapes, 1971) deals with the relationship between selected characteristics of ninth grade boys and curriculum selection and success in tenth grade. Monograph number 3 (Impellitteri and Kapes, 1971) deals exclusively with the measurement of occupational values and the development of the OVI.

In several cases, studies will appear in more than one category because they provide information which overlaps the aforementioned areas. In reviewing the studies contained in category three, only those aspects of the study which apply to change in work values will be reviewed. A summary of the findings from the three areas is provided at the end of this review.

Studies in the Area of Career Development Which are Related to Change in Work Values Over Time

Fleege and Malone (1946) investigated value stability in a cross-sectional study among students between the ages of twelve and fourteen. The results of their efforts revealed little differences among the occupational value structure of junior and senior high students. In another cross-sectional study, Singer and Stefflre (1954a) investigated age differences in job values and desires between a sample of high school male seniors (N = 373) and Centers' (1949) sample of adult males (N = 809) using Centers' Job Value Questionnaire. The study revealed significant differences between adolescent and adult males on preferences toward job values. The adult group selected the values of self-expression and independence more than any other value and chose power and

fame the least. In contrast, the adolescent hierarchy placed self-expression and interest utmost and chose leadership and esteem the least. It would be difficult to generalize from the findings of this particular piece of research because of the methodology involved. The study was not longitudinal and utilized two different samples taken at extreme points in time, making the results highly situational.

Wagman (1968) using Centers' Job Values Questionnaire investigated sex and age differences among university sophomores and high school seniors related to occupational value stability. Wagman administered Centers' instrument to 122 men and 137 women who were enrolled in an introductory psychology course at the University of Illinois in the spring of 1962. This group was compared to a sample of senior high school students (males = 373, females = 416) used in studies conducted by Singer and Stefflre (1954a, 1954b) who were investigating values relative to sex and age differences. Wagman's findings related to age differences revealed significant differences in value hierarchy among the different groups. Senior high boys scored higher on such job values as security and independence while sophomore men scored higher on the occupational values of leadership, interesting experience and esteem. Related to age differences for females, senior high girls scored higher on the occupational values of security and independence whereas university sophomore women preferred the job value of interesting experience. Wagman's results should be viewed with caution since his research design was cross-sectional rather than longitudinal; however, for the most part, the groups had more similarities than differences.

Thompson (1966) examined the change in occupational values between ninth and tenth grades in a group of 1,700 high school students. The

instrument used to assess the occupational values was adapted from Centers' (1949) study. When looking at the sample as a whole, little difference was found between the one year time intervals. When the data was identified by sex, some differences were found in rating occupational values. Males tended to place more value on leadership, salary and recognition and less on self-expression and social service than did females.

Dipboye and Anderson (1959) investigated the ranking of nine occupational values by male and female high school freshmen and senior students. Their sample consisted of 1,131 high school students attending schools in urban, suburban and semirural areas in Central New York. Within the sample, there were 823 pupils (410 boys and 413 girls) in the ninth grade and 358 pupils (171 boys and 187 girls) in the twelfth grade. Their findings related to sex differences for both ninth and twelfth grade boys and girls revealed a great deal of similarity in the pattern of mean ranking of the nine occupational values. Differences did appear, however, when the mean rankings of the individual values for the various groups were compared. Their findings related to sex and grade differences showed an even greater amount of similarity between the responses of the pupils for the two grades than that exists between the sexes. They concluded that "the relatively small differences between the ninth and twelfth graders would seem to indicate that occupational values are generally well formed by the time the pupil completes the ninth grade and that little change takes place during his high school career."

Searle (1962) investigated the stability of occupational values in a longitudinal study among a selected population of dropouts, graduates,

and students from the Michigan State University. Searle concluded that no one vocational value differentiated between dropouts, graduates, and students. "It seems that the results on the whole tend to reflect either idealized responses or the fact that values are more stable than perceived."

Gribbons and Lohnes (1965, 1968) examined the shifts in adolescents' vocational values over a seven year period. Data was collected through interviewing techniques for 111 boys and girls beginning at the eighth grade. The interview consisted of a series of questions dealing with value configurations resulting in the organization of 12 occupational value categories which seemed to accommodate the responses from the interviews. The interviews were conducted over four points in time (eighth grade, tenth grade, twelfth grade, and two years out of high school). This research effort sought specific answers to two questions: (1) Is there an important shift in the typical hierarchy of vocational values over seven years of adolescence? and (2) Is there an important difference between the typical hierarchy of vocational values for boys and that for girls?

Related to the first question, Gribbons and Lohnes did detect significant shifts in the hierarchy of vocational values over the seven year period. They also stated that there was relatively little change in the value that an adolescent places utmost in his own value hierarchy. By far, the most popular occupational values held by both sexes was interest and satisfaction. The most noticeable trend for the sample, ignoring sex differences, was the development of a less idealistic value hierarchy over the seven year time period. The sample changed their emphasis from such values as social services, personal goals, location

and travel, to marriage and family, preparation and ability, and advancement.

Related to the second question, Gribbons and Lohnes found that typical hierarchies of vocational values for the two sexes does reveal an important contrast. Boys gave higher rankings to salary and prestige values while girls placed more importance on such values as personal contact and social service. Gribbons and Lohnes concluded that overall comparisons of the final hierarchies for the two sexes is dominated by similarities rather than by differences.

Zytowski (1970) made a rather complete review of the concept of work values. Relative to the stability of occupational values, Zytowski indicated that to take a firm position would be somewhat unrealistic as a result of inconsistency among related research studies.

The literature reviewed here and in previous related VDS monographs has uncovered the following findings which are pertinent for this study:

1. The construct of work values appears to be valid and useful in describing vocational behavior. Also, work values have been found to play a significant role in the occupational choice and development process.
2. Work values have been found to be related to sex, curriculum choice, ability, socioeconomic status, school achievement, aspirations, age, interests, occupational choice, and personal adjustment.
3. The Occupational Values Inventory (OVI) appears to be a valid measure of work values for use in vocational development research.

4. Work values appear to be stable enough in ninth grade to warrant their usefulness in vocational guidance, however, they also appear to fluctuate enough in intensity and direction during the high school years to make further research necessary.
5. In order to validly study the change in occupational values structure during the high school years, a longitudinal research design is essential.

III

PROCEDURES OF THE INVESTIGATION

The following information describes in detail the method to be used in the investigation. Areas to be discussed include: population and sample, independent and dependent variables, and data analysis.

Population and Sample

The population from which the sample was obtained consists of total ninth grade enrollment of the three public junior high schools in the city of Altoona, Pennsylvania during the 1968-69 school year. The Altoona School District has an approximate student population of 15,000 with the ninth grade enrollment during the 1968-69 school year consisting of approximately 1,100 boys and girls.

Initial data was collected during the spring of 1969 when an attempt was made to sample all ninth graders in the Altoona Public Schools. The sample was collected as part of a longitudinal study of vocational development being conducted by the Department of Vocational Education at The Pennsylvania State University. Of the approximate 1,100 boys and girls attending ninth grade during the 1968-69 school year, complete data was available on 488 boys and 490 girls or approximately 90 percent of the available population. In order to remain in the study, a student needed to have completed the OVI at the end of tenth grade and be assigned course grades for that year. Of the 488 boys and 490 girls in the sample at the end of ninth grade, 365 boys and 316 girls remained in the sample for the study at the end of tenth grade. Approximately 30 percent of the ninth grade sample was unavailable for this study as a result of incomplete data essential to the study.

Independent Variables

a) Curriculum--Was chosen as an independent variable because it appears reasonable that if values were to change between ninth and tenth grade, this change could be related to the differences experienced in the curriculum. It is hypothesized that students enrolled in the different curriculums have undergone substantially different treatments over the one year time interval involved in the study. Within the Altoona school system, an individual has the option of entering into five curriculums: academic, academic business, vocational-technical, home economics and stenographic. From these five classifications, the dichotomous variable of curriculum was created with vocational and academic being the two components of the dichotomy. The academic classification was created by combining the academic and academic business curriculums. Both these curriculums are college preparatory and similar in nature which provided justification for their grouping. The vocational classification is composed of the remainder of curriculum choices: vocational-technical, home economics and stenographic. The vocational curriculum was coded +1 and the academic curriculum coded -1.

b) Sex--The dichotomy of sex in the research studies reviewed did consistently appear to be related to an individual's occupational value structure. Weak, but consistent relationships have been demonstrated between an individual's sex and change in values over time. Because of the consistent relationship between sex and work values found in the literature, it was expected that change in values could be related to sex. Males were coded +1 and females were coded -1.

c) Sex x Curriculum--From the research studies reviewed, both curriculum and sex have been shown to be related to an individual's value structure. The independent variable of sex x curriculum was created to look at the interaction of sex and curriculum with the effects of the other independent variables partialled out. This variable, in other words, enables the researcher to answer the question concerning the possible different effects of sex in the two curriculums. These possible differences could not be detected when the main effects of curriculum and sex are examined independently.

d) Family Background Measures--In reviewing studies of vocational development, it was found the various measures of family background were included and provide useful predictive information.

For the purpose of this study, it was decided to use two distinct family background variables--father's educational level and father's occupational level. Information about the family dwelling was not included because it was too difficult to obtain. Mother's occupational level was not used because of its high correlation with father's educational level as shown in the previous studies cited. Father's education was coded according to the following seven categories which appeared to be the most meaningful: (1) one year through six years, (2) seven years through nine years, (3) ten years through eleven years, (4) high school graduate--twelve years, (5) one year through three years of college, (6) college graduate, and (7) college graduate plus additional graduate studies. Father's occupational level was converted to the following six levels of Roe's (1956) classification scheme: (1) Professional and Managerial I, (2) Professional and Managerial II, (3) Semi-Professional and Small Business, (4) Skilled, (5) Semi-Skilled, and (6) Unskilled.

e) Ability Measures--Many studies investigating the process of occupational choice have taken into account the concept of ability or aptitudes, and some of the studies reviewed have shown aptitudes to be significantly related to an individual's occupational values structure. The instrument used in this study to assess student ability was the General Aptitude Test Battery (GATB). In previous research studies (Impellitteri and Kapes, 1969; Kapes, 1971), the GATB was found to be related to selection of and success in both vocational and academic curriculums.

The GATB, which was developed by the United States Employment Service in 1947, consists of nine aptitudes. Two of the nine GATB aptitudes will be used in this study as cognitive ability measures.

> V--Verbal Aptitude-The ability to understand meaning of words and to use them effectively. The ability to comprehend language, to understand relationships between words and to understand meanings of whole sentences and paragraphs.
>
> N--Numerical Aptitude-Ability to perform arithmetic operations quickly and accurately.

The GATB also contains a General Aptitude (G) which is similar to an IQ score and is made up of a weighted combination of GATB aptitudes V, N and S. The rational behind the use of aptitudes V and N in the measurement of general ability instead of aptitude G is that using these two aptitudes could provide additional useful information about the relative contribution of the different abilities composing general intelligence.

f) Success in High School--Review of related studies has disclosed that success in high school plays an important part in the process of occupational choice. What is a valid measure of an individual's success in high school isn't exactly known. The measure of success used in this

study is an individual's grade point average (GPA) at the end of tenth grade computed as a result of applying a weighted formula which is intended to result in an accurate estimate of achievement for both academic and vocational students.

For the academic students, GPA was computed using the weighted formula applied by the Altoona school system. This formula gives an additional 20 percent weight to three advanced courses which might be taken in tenth grade--geometry, chemistry, and a third year of a foreign language. Using the weighted grades for advanced subjects and the unweighted grades for all other major subjects, the GPA is computed by summing over all major subjects' grades and dividing by the number of subjects. Only major subjects were used to compute the GPA with such subjects as physical education, art and music being omitted. The number of major subjects included ranged from three to five with five being the most frequent number of subjects taken.

For the vocational students, a different system for computing GPA was felt to be desirable. In all shop or laboratory areas except computer technology and engineering related technology, a vocational student spent 50 percent of his day in that particular shop or laboratory. In the case of the two areas mentioned above, the students spent 40 percent of their day in the laboratory. Because of the amount of time spent in the shop or laboratory and because of the degree of commitment to a particular occupational area required of a vocational student, it was decided to weight a vocational student's end of year shop or laboratory average grade as 50 percent of his GPA. A vocational student generally attends class in three or four non-vocational subjects during that part of the day when he or she is not in shop. The student's non-vocational

GPA is obtained by adding together his non-vocational subjects' grades (including those which received additional weight for advanced subjects if applicable) and dividing by the number of subjects taken. This total was then added to the vocational grade and divided by two to obtain the combined GPA.

The Dependent Variables

As stated previously, the purpose of this study is to explore the relationships between selected student characteristics and an individual's occupational value structure over a one year time period.

Although a number of instruments for the measurement of occupational values have been developed, the instrument selected for this study is the Occupational Values Inventory (OVI). A monograph co-authored by Impellitteri and Kapes (1971) describes the development of this instrument and reports preliminary validation studies. The unique contribution of this instrument is that it contains actual "valuing tasks" in an ipsative format phrased in a language easily understood by ninth graders. The following seven occupational values are assessed by the OVI:

1. Interest and Satisfaction--One likes the work, enjoys it, is happy at it, fulfills oneself by doing it.

2. Advancement--One perceives the opportunity to get ahead in the work, sees a good future in it, it provides an opportunity to improve oneself.

3. Salary--One perceives the financial return resulting from the work, can make a good living at it, sees it as an opportunity for a good income.

4. Prestige--One is impressed by the responsibility attached to the work, can earn recognition from it, desires the feeling of importance that goes with it.

5. Personal Goal--One sees the work as fitting into his way of life, is what one always wanted to do, has been shooting for it, it's the ideal.

6. Preparation and Ability--One can succeed in the work, is good at it, it's where one's talents lie, is suited for it.

7. Security--One can obtain employment in this work, perceives that workers are needed in it, there will always be openings in it.

Three separate sets of scores were utilized as dependent or criterion variables for this study. Each set of scores is composed of the seven OVI values and are of the following nature:

a) Ninth grade OVI scores obtained during the spring of 1969 in the Altoona school system.

b) Tenth grade OVI scores obtained during the spring of 1970 in the Altoona school system (approximately 13 months later).

c) Ninth grade to tenth grade change scores obtained by subtracting each individual's OVI tenth grade score from each corresponding OVI ninth grade score and adding a constant of 30 to eliminate all negative scores (e.g. a change score of zero represents a tenth grade values score which was 30 points higher than the corresponding ninth grade value score).

Analysis

The statistical methodology employed in this study was twofold. Questions 1, 3 and 4 were answered using a Pearson Product-Moment Correlation Analysis (PPMCA). Through this technique, the researcher may determine to what degree two variables are linearly related.

Questions 2, 5 and 6 utilized the technique of multiple regression analysis (MRA). The multiple regression model used in this study will take the following form:

$$y = b_o + b_1 x_1 + b_2 x_2 + \ldots b_k x_k + e$$

where

y = dependent variable

$x_1, x_2, \ldots x_b$ = independent variables

$b_o, b_1, b_2 \ldots b_b$ = partial regression coefficients

e = error term

The particular equations used here are:

$$y_i = b_o + b_1 x_1 + b_2 x_2 + \ldots b_7 x_7 + e$$

where

y_1 = ninth grade OVI scores

y_2 = tenth grade OVI scores

y_3 = change score plus a constant of 30 for each one of the seven values in the OVI

and

x_1 = sex (males = +1, females = -1)

x_2 = curriculum (Vocational = +1, Academic = -1)

x_3 = sex x curriculum

x_4 = father's educational level

x_5 = father's occupational level

x_6 = GATB--verbal aptitude (V)

x_7 = GATB--numerical aptitude (N)

x_8 = GPA in tenth grade

Through the use of multiple regression analysis, it is possible to partial out the effects of K-1 independent variables which results in the isolation of the unique contribution to the dependent variable made by the kth independent variable. This unique contribution holds true only for that exact set of k variables included in the equation. The addition or subtraction of variables to this set would result in a redistribution of the explainable variance among the new set of independent variables. The meaningfulness of the partial regression coefficients then are dependent upon the theoretical meaningfulness of the variables included in the equation. With this consideration in mind, the variables included in the investigation have been selected.

The significance of the overall multiple R was tested using the F distribution with k and N-k-1 degrees of freedom. This results in a test of the general null hypothesis that all k partial regression coefficients are equal to zero. If the overall F was found to be significant and all partial regression coefficients were not equal to zero, each partial regression coefficient was tested using the F distribution with 1 and N-k-1 degrees of freedom. This results in a test of the hypothesis that $B_k = 0$.

In answering question number seven, the pooled variance t test was used to compute the differences between all possible combinations of sex and curriculum when the interaction term was found to be significant in the MRA analysis. Alpha levels of .05 and .01 were used in describing each variable's probable departure from a zero relationship in all analyses conducted.

IV

FINDINGS

Introduction

The results of this investigation are reported here as they relate to each one of the questions stated in the statement of the problem. All statistical information is presented in table form and is discussed only to the extent necessary to sufficiently explain and interpret its meaning. Further clarification of the findings will be presented in the final chapter.

Before proceeding into the questions listed in the statement of the problem, Table 1 is presented for the purpose of providing background information concerning the dependent variables utilized in this study. Table 1 contains means and standard deviations for OVI 9th grade, 10th grade and change scores as well as the correlations between 9th and 10th grade OVI scores. When interpreting Table 1, it should be remembered that the means and standard deviations for each of the OVI scores represent a combination of individuals; male, females, academic and vocational students. Reviewing the findings of Table 1 and ignoring within group differences would be misleading. As an example, academic males could change between 9th and 10th grade from a very low to a very high Prestige value score. For the same time interval vocational males could move in the opposite direction. This would result in a mean and standard deviation which would not reflect the change which took place within groups. This situation provides further justification for the researcher's selection of sex, curriculum, and curriculum x sex as independent variables.

Table 1. Mean and Standard Deviation for 9th Grade, 10th Grade and OVI Change Scores and Correlation Between 9th and 10th Grade OVI Scores

(N = 680)

Seven OVI Values	9th Grade		10th Grade		Change		r_{xy}
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	9th-10th
1. Interest and Satisfaction	19.39	4.86	20.29	4.77	29.10	4.90	.48
2. Advancement	13.55	5.27	13.19	5.86	30.36	5.86	.45
3. Salary	12.64	7.12	13.55	7.78	29.09	7.87	.44
4. Prestige	11.62	5.07	9.90	5.38	31.71	5.62	.42
5. Personal Goal	18.46	4.72	19.02	5.02	29.44	5.15	.44
6. Preparation and Ability	17.15	4.61	18.82	4.73	28.33	5.19	.38
7. Security	12.15	5.52	10.21	5.52	31.93	5.81	.45

Note: $r \geq .115$ significant at .01 level.

From Table 1, it can be seen that Interest and Satisfaction maintained the highest mean score in both 9th and 10th grade. Salary maintained the largest standard deviation of the seven OVI values for both grades. The majority of the OVI scores yielded similar means and standard deviation over the prescribed time period. Four of the seven values: Interest and Satisfaction, Salary, Personal Goals and Preparation and Ability experienced a slight increase in value magnitude while Prestige and Security declined and Advancement remained relatively the same. The OVI change scores show relatively small deviations from the zero difference score of 30.

Table 5 which is presented in answering Question 4 contains the intercorrelations among the independent variables and is helpful in providing background information concerning the eight independent variables used in this study. Approximately 20 out of a possible 28 intercorrelations were significant at least at the .05 level. The intercorrelations ranged from -.44 to .57. A correlation as high as .57 between two variables still results in approximately 70% unique variance. From this analysis it was felt that the independent variables were relatively independent of one another.

Question #1

What is the relationship between each of the characteristics and each of the seven OVI values as measured in ninth grade and again in tenth grade?

Table 2 contains the zero-order correlations between the seven OVI scores for both 9th and 10th grade, and the eight independent variables. The correlations between the dependent variables and the independent

Table 2. Correlation Between Independent Variables and OVI 9th and 10th Grade Scores

Independent Variables	Seven 9th Grade OVI Values							Seven 10th Grade OVI Values						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Curriculum	-.15	.07	.11	-.08	-.13	.03	.08	-.13	.08	.08	-.02	-.16	.03	.04
Sex	-.22	.16	.23	-.05	-.22	-.04	-.01	-.19	.16	.23	-.03	-.25	-.06	-.02
Curriculum X Sex	-.03	-.06	.01	-.08	-.00	.02	.13	-.11	.02	.02	-.08	-.06	.02	.15
Father's Educational Level	.12	.00	-.03	.06	.02	-.09	-.06	.12	-.07	.02	.01	.04	-.05	-.07
Father's Occupational Level	-.09	.04	.03	-.07	-.05	.10	.02	-.09	.03	.02	-.03	-.05	.09	.02
GATB-V	.35	-.08	-.16	-.03	.18	-.01	-.16	.25	-.08	-.05	-.06	.12	.02	-.14
GATB-N	.22	-.01	-.14	-.05	.16	.07	-.15	.18	.01	-.03	-.10	.09	.02	-.13
GPA	.29	-.04	-.17	-.05	.16	.02	-.11	.23	-.05	-.04	-.06	.07	-.00	-.09

Notes: $r \geq .088$ significant at .05 level. $r \geq .115$ significant at .01 level.

variables range from -.22 to .35. A correlation coefficient of .088 is significant at the .05 level and .115 at the .01 level. Inspection of Table 2 reveals 43 significnat relationships at the .05 level, but it is also noted that many are relatively low, accounting for only a small portion of the variance.

From Table 2 it can be seen that curriculum, sex, GATB-V, GATB-N, and GPA are the most useful predictors of the two sets of OVI scores. Father's educational and occupational level revealed only seven significant relationships with the criteria out of a possible 28. Interest and Satisfaction, Salary and Personal Goal were the most predictable ninth grade occupational values, while Interest and Satisfaction, Personal Goal and Security were the most predictable tenth grade values. Overall, the independent variables were more highly related to the ninth grade criteria than to the tenth grade criteria.

More important than the zero-order correlation between the independent variable and the criteria is the total unique contribution of all these variables taken together. For this reason, Multiple Regression Analysis (MRA) has been used in this study.

Question #2

What is the relationship between the composite of all the characteristics taken together and each of the seven OVI values as measured in the ninth grade and again in tenth grade?

Reviewing Table 2 reveals that many of the eight independent variables are significantly related at the .05 level to the two sets of dependent variables; OVI ninth grade scores and OVI tenth grade scores.

MRA was conducted in order to examine the total amount of unique predictive information available from the eight independent variables. The results of these full model analyses are presented in Tables 3 and 4. The total multiple correlations (R) obtained from these analyses range from .12 to .42. The unadjusted coefficients of determination (R^2) do not appear on these tables, but range from .02 to .18. Adjusting the coefficient of determination for degrees of freedom accounts for the shrinkage which could be expected upon cross-validation. The coefficients of determination adjusted for degrees of freedom range from zero to .17. The significance of the total relationship is tested by dividing the mean squares regression (MSR) by the mean squares error (MSE) to obtain an F-ratio with K and N-k-1 degrees of freedom. In order for this ratio to be significant, a value of 1.98 was needed at the .05 level and 2.60 was needed at the .01 level, 12 out of the 14 F-ratios were significant at least at the .05 level. The tenth grade analysis for the two values of Prestige and Preparation and Ability did not yield significant F-ratios and, therefore, the partial regression coefficients in these models should not be interpreted.

The partial regression coefficient represents the amount of units of the independent variable which is uniquely associated with a one unit increase in each of the OVI values with the effect of all the other independent variables partialled out. The standard error of the partial regression coefficient is divided into the partial regression coefficient to obtain a "student t" value which may be compared to a tabled value of "t" with 1 and N-k-1 degrees of freedom to determine if there is a significant relationship. The critical "t" values were 1.98 at the .05 level and 2.60 at the .01 level. Inspection of the data revealed 20

Table 3. Regression Analysis Between the Eight Independent Variables and Each of the Seven OVI Values for the 9th Grade Sample

(N = 680)

Independent Variables	Seven OVI Values[a]						
	1	2	3	4	5	6	7
Curriculum	-.19[b]	.19	.25	-.34	-.32	.13	.26
	(.18)[c]	(.20)	(.27)	(.20)	(.18)	(.18)	(.22)
Sex	.99**	.81**	1.60**	-.27	-.96**	-.19	-.01
	(.17)	(.20)	(.26)	(.20)	(.17)	(.18)	(.21)
Curriculum X Sex	-.01	-.30	.05	-.42*	.03	.07	.58**
	(.17)	(.20)	(.27)	(.20)	(.18)	(.18)	(.22)
Father's Educational Level	.22	.09	.02	.13	-.15	-.25	-.07
	(.18)	(.21)	(.28)	(.21)	(.19)	(.19)	(.23)
Father's Occupational Level	.00	.23	.00	-.32	-.10	.35	-.17
	(.18)	(.22)	(.29)	(.21)	(.20)	(.19)	(.23)
GATB-V	.11**	-.03	-.04	-.01	.04	-.12	-.05*
	(.02)	(.02)	(.03)	(.02)	(.02)	(.02)	(.03)
GATB-N	.00	.01	-.02	-.02	.02	.04*	-.03
	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)
GPA	.01**	.00	0.01*	-.00	.00	.00	.00
	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)	(.00)
Multiple R	.42	.19	.30	.16	.31	.15	.21
Coefficient of Determination ($\bar{R}^2$)[d]	.17	.03	.08	.02	.08	.01	.03
Significance of F Ratio	.01	.01	.01	.05	.01	.05	.01

Notes: a) Number 1 to 7 represent the seven value scales included in the OVI.
b) Partial Regression Coefficients rounded to two places.
c) Standard error of the coefficients rounded to two places.
d) Adjusted for degrees of freedom
* = Significant at .05 ----** = Significant at .01 ----NS = Not significant at .05.

Table 4. Regression Analysis Between the Eight Independent Variables and Each of the Seven OVI Values for the 10th Grade Sample

(N = 680)

Independent Variables	Seven OVI Values[a]						
	1	2	3	4	5	6	7
Curriculum	-.17[b]	.23	.33	-.11	-.51**	.17	.05
	(.18)[c]	(.23)	(.30)	(.21)	(.19)	(.19)	(.21)
Sex	-.89**	.96**	1.74**	-.21	-1.18**	-.28	-.15
	(.18)	(.23)	(.30)	(.21)	.19	(.18)	(.21)
Curriculum X Sex	-.44*	.08	.28	-.50*	-.24	.07	.75**
	(.17)	(.22)	(.30)	(.21)	(.19)	(.18)	(.22)
Father's Educational Level	.22	-.34	.31	-.06	.05	-.03	-.15
	(.[illegible])	(.24)	(.32)	(.22)	(.20)	(.20)	.23
Father's Occupational Level	-.05	-.04	.22	-.27	-.10	.42	-.17
	(.20)	(.24)	(.32)	(.23)	(.20)	(.20)*	(.23)
GATB-V	.06**	-.04	-.01	-.01	.03	.02	-.05
	(.02)	(.02)	(.03)	(.02)	(.02)	(.02)	(.02)
GATB-N	.00	.04	.01	-.04*	.01	.01	-.03
	(.01)	(.02)	(.03)	(.02)	(.01)	(.02)	(.02)
GPA	.01*	-.00	.00	.00	.00	-.00	.00
	(.00)	(.23)	(.00)	(.00)	(.00)	(.00)	(.00)
Multiple R	.35	.21	.24	.15	.30	.12	.21
Coefficient of Determination ($\bar{R}^2$)[d]	.11	.03	.05	.01	.08	.00	.03
Significance of F Ratio	.01	.01	.01	NS	.01	NS	.01

Notes: a) Number 1 to 7 represent the seven value scales included in the OVI.
b) Partial Regression Coefficients rounded to two places.
c) Standard error of the coefficients rounded to two places.
d) Adjusted for degrees of freedom.
* = Significant at .05 ----** = Significant at .01 ----NS = Not significant at .05.

partial regression coefficients in the 12 MRA models with significant F-ratios departed from a zero relationship with the criteria at the .05 level.

Inspection of Tables 3 and 4 reveals that the independent variables sex, sex x curriculum, and GATB-V possessed the greatest number of unique significant relationships with the criteria while curriculum and father's educational and occupational level possess the least. As previously stated, the largest $\bar{R}^2$ in both of the ninth and tenth grade MRA models was .17 which means that all eight variables taken together only account for 17 percent of the variance in the criterion. Interest and Satisfaction, Salary, and Personal Goal in both 9th and 10th grade possessed the greatest amount of explained variance with $\bar{R}^2$ ranging from .05 to .17, while Prestige and Preparation and Ability possessed the least with $\bar{R}^2$ ranging from zero to .02.

Question #3

What is the relationship between each of the seven OVI values as measured in the ninth grade and these same values as measured in tenth grade?

Table 1 contains the correlation coefficients between the 9th and 10th grade OVI scores. Inspection of this table reveals correlations ranging from .38 to .48. Interest and Satisfaction, Advancement, Salary, Personal Goal and Security maintained the highest correlations ranging from .44 to .48. The lack of magnitude in the size of existing correlations can be attributed to either error within the measuring instrument itself or a direct change in the magnitude and/or direction of an individual's occupational value structure. A further discussion

of the problem of interpreting a correlation obtained over time as an indicator of change versus an indicator of error of measurement will be provided in Chapter 5.

Question #4

What is the relationship between each of the characteristics and changes in each of the seven OVI values from ninth to tenth grade?

Table 5 contains the zero-order correlations among the seven OVI change scores and the eight independent variables. The zero-order correlations among the dependent variables and the independent variables range from -.11 to .08. A correlation coefficient of .088 is significant at the .05 level and .115 at the .01 level. Inspection of these correlations reveal only four out of a possible 56 correlation coefficients are significant at the .05 level. The level of zero-order relationships discovered here would eliminate any hope of attaining a multiple correlation of any significance. It is likely that even the four relationships found to be significant are in fact due to error of a family wise type.

Question #5

What is the relationship between the composite of all of the characteristics taken together and changes in each of the seven OVI values from ninth to tenth grade?

As stated above, Table 5 reveals that all but four of the zero-order correlations between the independent variables and the dependent variables were not significant. The total multiple correlations (R)

Table 5. Correlations Between OVI Change Scores and Independent Variables and Intercorrelation of Independent Variables

Independent Variables	Seven OVI 9th, 10th Grade Change Scores							Intercorrelation of Independent Variables						
	1	2	3	4	5	6	7	2	3	4	5	6	7	8
1. Curriculum	-.02	-.02	.01	.05	.04	.00	.04	.16	.08	-.17	.13	-.19	-.14	-.15
2. Sex	-.03	-.02	-.01	-.02	.04	.01	.03		-.05	.07	-.02	-.05	-.05	-.01
3. Curriculum X Sex	.08	-.07	-.01	.00	.05	.00	-.02			-.17	-.09	.08	-.04	-.03
4. Father's Educational Level	.00	.07	-.05	.05	-.03	-.04	.01				-.44	.21	.13	.21
5. Father's Occupational Level	-.01	.01	.01	-.03	.01	.01	.00					-.21	-.13	-.16
6. GATB-V	.10	.02	-.09	.03	.05	-.03	-.02						.54	.57
7. GATB-N	.04	-.02	-.09	.05	.06	.04	-.02							.55
8. GPA	.06	.01	-.11	.02	.08	.02	-.02							

Notes: $r \geq .088$ significant at .05 level. $r \geq .115$ significant at .01 level.

obtained from these analyses range from .05 to .13. The coefficient of determination adjusted for degrees of freedom ($\bar{R}^2$) range from zero to .01. In order for the F-ratio to be significant, a value of 1.98 was needed at the .05 level. As expected, none of the seven F-ratios were significant at the .05 level. Because this full model analysis yielded entirely non-significant multiple R's, no tabular presentation of the MRA is presented.

Question #6

In the analysis for Questions number 2 and 5 with the effect of ability, achievement and socioeconomic status partialled out, do the two conditions of curriculum (vocational vs. non-vocational) differ with respect to the two conditions of sex (male vs. female)?

Table 6 describes a further analysis of those MRA models which demonstrate a significant degree of interaction for the two variables of sex and curriculum. The interaction term reflects the belief of the investigators that there are sex differences related to an individual's value structure which are confounded with curriculum differences. These two factors--sex and curriculum can be considered as a 2 x 2 factorial design with the remaining independent variables as covariates. Four of the 12 significant MRA models revealed a significant amount of interaction among the four cell means. Prestige and Security yielded significant interactions in ninth grade with Interest and Satisfaction and Security emerging significant in tenth grade.

The differences among the four cell means can be most clearly seen from an examination of the ranking of means at the bottom of Table 6.

Table 6. Interaction Between Sex and Curriculum in the 12 Significant MRA Models

OVI Value	Sex	Cell Means Curriculum Vocational	Academic	Interaction Diagrams OVI Units	VOC	ACA
9th Grade Prestige	Male	10.72	12.20	13 12 11 10 9	M	
	Female	12.02	11.80		F	
9th Grade Security	Male	13.17	10.97	14 13 12 11 10	M	
	Female	11.77	12.30		F	
10th Grade Interest and Satisfaction	Male	18.66	20.54	22 21 20 19 18	F	
	Female	21.41	21.19		M	
10th Grade Security	Male	11.00	8.93	12 11 10 9 8	M	
	Female	9.57	10.86		F	

OVI Values	Ranking of Mean Values			
Prestige 9th Grade	ACA. M 12.20	VOC. F 12.02	ACA. F 11.80	VOC. M 10.70
Security 9th Grade	VOC. M 13.20	ACA. F 12.30	VOC. F 11.70	ACA. M 11.00
Interest and Satisfaction 10th Grade	VOC. F 21.40	ACA. F 21.20	ACA. M 20.50	VOC. M 18.60
Security 10th Grade	VOC. M 11.00	ACA. F 10.86	VOC. F 9.50	ACA. M 8.90

Note: Mean values which share a line are not significantly different from one another at the .05 level using a pooled variance "t" test.

In carrying out this analysis, actual and not corrected means were compared using a pooled variance "t" test. It can be seen from the table that vocational males were always at one extreme and were also always significantly different from academic males and vocational females. Academic males were always similar to vocational females, but only similar to academic females in two out of the four comparisons. For the security value which yielded an interaction in both ninth and tenth grades, the mean value scores show a consistent decrease with time, however, the degree and direction of relationship among cell means is almost unchanged. A discussion of the practical significance of these interactions will be discussed in Chapter 5.

V

SUMMARY, CONCLUSION AND DISCUSSION

Summary

Today's educational trends appear to be favoring a renewed interest in occupational education. The Career Education concept as proposed by Marland is a good example of this emphasis on occupational education. In order to implement new educational models, more will need to be known about the vocational development process. While the present theories of vocational development provide some of the needed understandings, many of the constructs underlying the theories have not been adequately explored or understood.

In order to shed additional light on the Vocational Development process, this study was designed to further investigate the construct of work values. Previous works by Katz (1963) and Zytowski (1970) have demonstrated the usefulness of the work values construct. Many other researchers have investigated aspects of the work values construct and a summary of their findings appear in the review of the literature. Since many of these studies appear to assume that work values are of a dynamic nature, it was decided to investigate the construct in a dynamic design. This design called for examining the relationship between selected student characteristics which, from previous research, appeared to be related to work values, and a measure of work values at two points in time. Additional questions were raised which were designed to ascertain how much change took place and whether or not the change was related to the student characteristics. The Occupational Values Inventory (OVI) (Impellitteri and Kapes, 1971) was the instrument used to assess work values. The OVI measures the following seven work values:

Interest and Satisfaction, Advancement, Salary, Prestige, Personal Goal, Preparation and Ability, and Security. The student characteristics employed in the study included: Sex, Curriculum, Father's Educational Level, Father's Occupational Level, GATB-V, GATB-N and GPA. The sample for the study was composed of 680 male and female students from the Altoona Pennsylvania School System who were tested with the OVI at the end of their ninth grade year (1969) and again at the end of tenth grade (1970). Analysis of data consisted of examining the zero order correlations between each of the student characteristics and each value as measured by the OVI in ninth grade, again in tenth grade, and by using an artificially created change score. Further analysis examined the total relationship between all of the student characteristics taken together and each value score for all three measures using Multiple Regression Analysis (MRA). A Sex X curriculum interaction term was included in the MRA.

The investigation was designed to answer the following specific questions:

1. What is the relationship between each of the characteristics and each of the seven OVI values as measured in ninth grade and again in tenth grade?
2. What is the relationship between the composite of all of the characteristics taken together and each of the seven OVI values as measured in ninth grade and again in tenth grade?
3. What is the relationship between each of the seven OVI values as measured in ninth grade and these same values as measured in tenth grade?

4. What is the relationship between each of the characteristics and changes in each of the seven OVI values from ninth to tenth grade?
5. What is the relationship between the composite of all of the characteristics taken together and changes in each of the seven OVI values from ninth to tenth grade?
6. In the analysis for questions numbers 2 and 5 with the effect of ability, achievement and socioeconomic status partialled out, do the two conditions of curriculum (vocational vs. non-vocational) differ with respect to the two conditions of sex (male vs. female)?

Conclusions

The conclusions are stated as they are related to each of the questions asked.

Question #1. In both ninth and tenth grade, Interest and Satisfaction possessed the highest average correlations with all eight independent variables. The value was found to be related to all of the student characteristics in each analysis. A higher Interest and Satisfaction value was found to be related to greater ability as measured by GATB V and N scores, greater Achievement as measured by GPA and a more favorable Socioeconomic Status as measured by Father's Educational and Occupational level. Being in the academic curriculum and being female was also related to a higher Interest and Satisfaction value in both grades. Little difference was found between the ninth and tenth grade in terms of the size of the relationships although the ninth grade correlations were slightly larger. These findings agree with previous

research (Singer and Stefflre, 1954a and 1954b; Stefflre, 1959, Dipboye and Anderson, 1959; and Gribbons and Lohnes, 1965) concerning the importance of the Interest and Satisfaction value and its relationship to certain student characteristics.

The Advancement value was unrelated to most of the student characteristics used in this study in both ninth and tenth grades. Only Sex showed a high degree of relationship in both grades with males placing a higher value on Advancement in both cases. The Dipboye and Anderson (1959) study supports this finding.

The Salary value was related to Curriculum, Sex, Ability and GPA in ninth grade with vocational students, males, and lower ability and achievement students placing more value on Salary. In tenth grade, however, only Sex was highly related to this value with males again valuing Salary higher than females. The Singer and Stefflre (1954b) and Dipboye and Anderson (1959) studies concurred with the Sex differences found in this study.

The Prestige value showed only one significant relationship in both ninth and tenth grade analysis. In tenth grade those who scored higher on GATB-N valued Prestige less. The findings in this study are inconsistent with previous studies by Dipboye and Anderson (1959) who found girls valuing Prestige more highly than boys, and Kapes (1971) who found Prestige related to curriculum choice and Vocational GPA for males.

The value of Personal Goal was second only to Interest and Satisfaction in the number of significant relationships produced. Those who were enrolled in Academic Curriculum, were female and possessed higher ability scores; placed more value on Personal Goal in both ninth and tenth grades. Higher GPA was also related to a higher Personal Goal value in ninth grade, but not in tenth grade. No comparative finding

was available, but it should be noted that the Personal Goal value is highly related to the Interest and Satisfaction value and these results are very similar to those obtained for that value.

The relationship between Preparation and Ability and the student characteristics employed in this study are among the smallest found for any of the values. However, this value is significantly related to both socioeconomic variables in ninth grade and to Father's Occupational level in tenth grade. In all cases, the lower the level, the higher the value. Again, no comparative studies are available.

The Security value was related to both Ability and Achievement in both ninth and tenth grade analyses. Lower ability and less achieving students valued Security more highly. Although curriculum and sex were not related to this value, a significant interaction between these two variables was found and will be explored later. The Dipboye and Anderson (1959) and Singer and Stefflre (1954b) studies also found sex to be unrelated to the Security value. The Kapes (1971) study found Security to be related to curriculum choice and GPA for academic males.

Question #2. Since the relationship between each of the independent variables and each value was discussed under Question #1, only the overall relationships will be examined here. From Tables 3 and 4 it can be seen that the value of Interest and Satisfaction is the most predictable value given the student characteristics used in the study. This holds true for both ninth and tenth grades. The least predictable values in ninth grade were Prestige and Preparation and Ability which produced barely significant F-ratios. In tenth grade these values were no longer predictable using the student characteristics in this study. In all cases, the amount of explained variance either remained the same or

dropped from ninth to tenth grade. When the total amount of explained variance is considered, it can be seen that at best only 17 percent could be explained by the student's characteristics used.

Several possible explanations exist for the lack of predictability of the values used in this study. The first obvious possible explanation is that the criterion instrument used (the OVI) does not reliably and validly measure occupational values. While this is plausible, given the reliability coefficients reported in the manual for the OVI (Impellitteri and Kapes, 1971), it can also be said that values are difficult to measure using any instrument. The other plausible explanation for the low predictability of the OVI values lies in the selection of predictors. Perhaps the values are much more predictable using other student characteristic information. Lastly, it must be added that in all human prediction problems, a great deal of measurement error is always present.

Looking at the results from this analysis in a more positive vein, it can still be said that the occupational values measured by the OVI are definitely predictable beyond chance and are related in varying degrees to the student characteristics used in the study.

Question #3. The question is posed to ascertain just how much change took place over the one year time period. Judging from the relatively low correlations found (between .38 and .48), a hasty conclusion would be to assume that the values change drastically. This conclusion would also fly in the face of much previous research [Dipboye and Anderson (1959), Gribbons and Lohnes (1968)] which found values to be relatively stable during this time.

One way to evaluate the meaning of the correlations found for the one year period is to compare these figures with the stability coefficients from the OVI manual (The Measurement of Occupational Values). The manual reports a median stability coefficient of .60 over a nine week period during the spring of the ninth grade year. Taking this into consideration, it can surely be said that a great deal of the apparent change is probably due to measurement error. A second ramification of measurement error is also likely due to the ipsative nature of the instrument. Because of this ipsativity, a change in one unit in one value is always accompanied by an equal change in another value. The resulting effect is that any instability due to measurement error is doubled when an ipsative instrument is used. As a partial answer to Question #3, it must be said that using an ipsative instrument to measure change needs to be explored further. The real amount of change in occupational values that took place between ninth and tenth grade has not been satisfactorily answered by this study.

Questions 4 and 5. Because of the measurement difficulties explored under Question #3, it is not surprising to find that the changes in occupational values observed between ninth and tenth grade were not significantly related to the student characteristics used in this study. A second reason for the lack of relationship is most certainly due to the use of a change score variable calculated by subtracting the two sets of scores involved. The resulting effect of creating a variable in this manner is to double the measurement error inherent in each of the two variables. Given the large amount of measurement error already present in each set of scores, it would have been surprising to find these change scores related to any student characteristics.

Question #6. This question deals with a very specific aspect of the problem of a change in occupational values between ninth and tenth grade. The question was included because the literature indicated that sex differences were important when considering occupational values and that if those values were to change, this change should be affected by the curriculum engaged in during the change period. The other variables in the model were considered as covariates in answering this question. The findings did provide useful information concerning the effects of sex within curriculum where certain occupational values are concerned. In both ninth and tenth grade the Security value yielded a significant interaction. The Prestige value yielded significant interactions in ninth grade and although the interaction term was also found to be significant in tenth grade, it was not explored further because the full model analysis was not significant. The value Interest and Satisfaction yielded a significant interaction in tenth grade, but not in ninth grade.

The findings from this analysis suggest that vocational males have a lower Prestige value than all of the other three groups of ninth graders. This finding is consistent with the findings of a previous VDS study (Kapes, 1971) which found a low prestige value to be related to choosing and being successful in a vocational curriculum. In tenth grade, it was again the vocational males who differed from the other three groups in terms of the Interest and Satisfaction value on which they scored lower. The results of the interaction for the Security value were almost identical for both ninth and tenth grades. In ninth grade vocational males and academic females scored higher than vocational females and academic males. This was a case of almost perfect complete reversal of curriculum effects by sex. In the tenth grade, the only

difference from ninth grade existed in the comparisons between the academic females and vocational females which did not yield a significant difference. The direction and significance of all other differences were similar to the ninth grade comparison.

The most important finding from this analysis lies in the fact that sex x curriculum differences are important when considering certain occupational values.

Discussion

Looking back on the nature of the questions asked and the procedures used in this study, it becomes apparent that a number of changes should be made in future attempts to explore the question of change in occupational values during the developmental years.

The first apparent difficulty appears to concern the nature of the instrument used to assess change. Along these lines, it is questionable that an ipsative instrument should be used when a change in all possible values is the question of interest. If the investigators were interested in only one or two values, the problems inherent in an ipsative instrument containing many values would not be serious and, therefore, this type of instrument could still provide the best method of assessing those selected values. The authors still believe in the use of an ipsative instrument where many choices are forced to be made, because this procedure represents a true valuing task. In the case where only a few of the scores are used, the remaining items making up the other values represent alternatives against which the values of interest are compared.

A second problem which arose in this study stems from the use of "difference" scores. Wrightstone et al., (Test Service Notebook 33)

discussing problems of measuring differences due to educational treatments, point out the problems inherent in using "difference" scores. The basic problem results from the fact that "difference" scores are unreliable due to the combining of measurement error from both pre and post tests. Thus, even if a fairly reliable test was used, the difference scores are most likely unreliable. As a solution to this problem, the authors suggest comparing the differences of groups rather than individuals because in this way the errors of measurement tend to cancel each other out rather than become cumulative. Increasing the reliability of the test being used is, of course, also a possible solution; but when the test is dealing with the affective domain such as in the case of values, it is unlikely that a high enough reliability can be achieved to make "difference" scores useful.

O'Connor (1972), writing on the measurement of change, suggests a totally different approach when assessing change in nonexperimental studies. His suggestion was to use multiple regression analysis with the post test as the criterion and the pre test as a covariate along with the treatment condition as an independent variable. When the partial regression coefficients are to be interpreted, they should be corrected for attenuation to account for the unreliability in the pre and post tests. For further information on these procedures, the reader is referred to the O'Connor article.

While the results of this study have been clouded by methodological and procedural difficulties, the authors still feel that need for continued study of the work values construct using a longitudinal design to explore changes which take place during the developmental years is supported by the findings of this study. It is the hope of the authors

that the findings of this study as well as the problems encountered will enhance the further investigation of the work values construct.

REFERENCES

Dipboye, W. J. and Anderson, W. F. "The Ordering of Occupational Values by High School Freshmen and Seniors." Personnel and Guidance Journal, 1959, 121-124.

Fleege, V. and Malone, H. "Motivation in Occupational Choice Among Junior High School and Senior High School Students." Journal of Educational Psychology, 1946, 37, 77-86.

Ginzberg, E., Ginsberg, S. W., Axelrad, S. and Herma, J. L. Occupational Choice: An Approach to a General Theory. New York: Columbia University Press, 1951.

Gribbons, Warren D. and Lohnes, Paul R. "Shifts in Adolescent Vocational Values." Personnel and Guidance Journal, 1965, 44, 248-257.

Gribbons, Warren D. and Lohnes, Paul R. Emerging Careers. New York: Teachers College Press, Columbia University, 1968.

Holland, John L. 'A Theory of Vocational Choice." Journal of Counseling Psychology, 1959, 6, 35-45.

Holland, John L. and Whitney, Douglas R. "Career Development." Review of Educational Research, 1969, 39, 227-230.

Impellitteri, Joseph T. and Kapes, Jerome T. "Using the GATB with Vocational or Technical Bound Ninth Grade Boys." Vocational Guidance Quarterly, 1969, 18, 59-64.

Impellitteri, Joseph T. and Kapes, Jerome T. The Measurement of Occupational Values. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, September, 1971, VDS Monograph, Number 3.

Kapes, Jerome T. "The Occupational Values of Ninth Graders who Select a Vocational vs. a Non-Vocational Curriculum in High School." (Unpublished paper, December, 1969).

Kapes, Jerome T. The Relationship Between Selected Characteristics of Ninth Grade Boys and Curriculum Selection and Success in Tenth Grade. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, August, 1971, VDS Monograph, Number 2.

Katz, Martin. Decisions and Values: A Rationale for Secondary School Guidance. New York: College Entrance Examination Board, 1963.

Katzell, Raymond A. "Personal Values, Job Satisfaction, and Job Behavior." In Man in a World at Work. Edited by Henry Borow, Boston: Houghton Mifflin, 1964.

Kinnane, J. F. and Pable, M. W. "Family Background and Work Value Orientation." Journal of Counseling Psychology, 1962, 9, 320-325.

Marland, Sidney P. "Career Education Now." Paper presented at the Convention of Association of Secondary School Principals, Houston, Texas, January 23, 1971.

O'Connor, Edward F., Jr. "Extending Classical Test Theory to the Measurement of Change." Review of Educational Research, Winter, 1972, Volume 42, 73-97.

Roe, Ann. Psychology of Occupations. New York: John Wiley and Sons, Inc., 1956.

Rosenberg, M. Occupations and Values. Glencoe, Illinois: The Free Press, 1957.

Schwarzweller, Harry K. "Values and Occupational Choice." Social Forces, 1960, 126-134.

Searl, R. R. "A Study of the Stability of Vocational Values as Measured by the VVI." Dissertation Abstracts, 1962, 23, 19441.

Singer, Stanley L. and Stefflre, Bufford. "Age Differences in Job Values and Desires." Journal of Counseling Psychology, 1954, 1, 80-91.

Singer, Stanley L. and Stefflre, B. "Sex Differences in Job Values and Desires." Personnel and Guidance Journal, 1954, 483-484.

Sprinthall, Norman A. "Work Values and Academic Achievement." Vocational Guidance Quarterly, 1966, 52-55.

Super, Donald E. The Psychology of Careers. New York: Harper, 1957.

Super, Donald E. "The Structure of Work Values in Relation to Status, Achievement, Interests and Adjustments." Journal of Applied Psychology, 1962, 46, 231-239.

Super, Donald E. and Overstreet, Phoebe L. The Vocational Maturity of Ninth Grade Boys. New York: Bureau of Publications, Teachers College, Columbia University, 1960.

Thompson, O. E. "Occupational Values in High School Students." Personnel and Guidance Journal, 1966, 44, 850-853.

Wagman, Morton. "Sex and Age Differences in Occupational Values." Personnel and Guidance Journal, 1965, 258-262.

Wrightstone, J. Wayne, Hogan, Thomas P. and Abbott, Muriel M. Accountability in Education and Associated Measurement Problems. Test Department, Harcourt Brace Jovanovich, Inc., Test Service Notebook 33.

Zytowski, Donald G. "The Concept of Work Values." Vocational Guidance Quarterly, 1970, 18, 176-186.

VOCATIONAL DEVELOPMENT STUDY SERIES

Impellitteri, Joseph T. and Kapes, Jerome T. A Longitudinal Study of Vocational Development: Implications for Vocational Education and Guidance. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, VDS Monograph Number 1, July, 1971.

Kapes, Jerome T. The Relationship Between Selected Characteristics of Ninth Grade Boys and Curriculum Selection and Success in Tenth Grade. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, VDS Monograph Number 2, August, 1971.

Impellitteri, Joseph T. and Kapes, Jerome T. The Measurement of Occupational Values. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, VDS Monograph Number 3, September, 1971.

Enderlein, Thomas E. An Examination of the Relationship of Selected Student Variables to Vocational-Technical Shop Achievement. University Park, Pennsylvania: Department of Vocational Education, The Pennsylvania State University, VDS Monograph Number 4, February, 1972.